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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,276	10/23/2003	Mustafa Pinarbasi	IBM1P088/SJO920000063US2	2354
50548	7590	11/08/2006	EXAMINER	
ZILKA-KOTAB, PC P.O. BOX 721120 SAN JOSE, CA 95172-1120			MCDONALD, RODNEY GLENN	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 11/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/693,276

Applicant(s)

PINARBASI, MUSTAFA

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 13-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, in Claims 13-15 it is unclear where there is support in the specification for showing the layers are deposited before significant oxidation occurs.

Claims 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13-15 are indefinite because "significant" lacks basis for comparison.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 8, 9, 10, 13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. (U.S. Pat. 5,986,858).

Regarding claims 1, 9, Sato et al. teach making GMR magnetic sensors such as spin valve magnetic sensors. (Column 1 lines 65-68) In Fig. 15 Sato et al. teach depositing a first ferromagnetic layer 42B of Co having a first surface on a substrate. Depositing a spacer layer 40C comprising a metallic aluminum layer having a second surface. Depositing a second ferromagnetic layer 43A. The spacer layer is disposed between the first and second ferromagnetic layers. On the surface of the first ferromagnetic layer 42B and the second surface of the spacer layer Al an oxide layer is formed by natural oxidation, thermal oxidation or plasma oxidation. The first ferromagnetic layer 42B of Co is formed by sputtering and then exposed to oxygen to produce a  $\text{CoO}_x$  layer 42C. (This is the exposing of the first surface to an oxygen partial pressure). After that the aluminum film (Fig. 15) is formed by sputtering (This is decreasing the oxygen partial pressure to zero to deposit the metallic Al layer) and then exposed to oxygen to form an  $\text{AlO}_x$  layer (This is the exposing of the second surface to an oxygen partial pressure). After that the second ferromagnetic layer 43A of Co is formed (This is decreasing the oxygen partial pressure to zero to deposit the second ferromagnetic layer). After that a ferromagnetic layer 43B is deposited. (Column 13 lines 62-68; Column 14 lines 1-46)

Regarding claims 8, 10, as discussed above the oxygen is stopped before depositing the subsequent layers. (Column 13 lines 62-68; Column 14 lines 1-46)

Regarding claims 13, 15, the spacer layer of aluminum and the second ferromagnetic is deposited before "significant" oxidation of the first ferromagnetic layer and the spacer layer, consecutively. "Significant" is believed to be any level of oxygen since the Applicants do not specify the metes and bounds of "significant". (See Sato et al. discussed above)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (U.S. Pat. 5,986,858) in view of Pinarbasi (U.S. Pat. 5,871,622).

Sato et al. is discussed above and all is applies as above. (See Sato et al. discussed above)

The difference between Sato et al. and the present claims is that ion beam sputtering for forming the layers is not discussed (Claim 6) and the use of a shutter for exposing the surface to oxygen is not discussed (Claim 7).

Regarding claim 6, Sato et al. teach utilizing ion beam sputtering for forming the layers of a spin valve magnetoresistance head. (See Abstract)

Regarding claim 7, Pinarbasi teach in Fig. 1 an ion beam sputtering device having a shutter 106. (See Fig. 1) Having the shutter 106 open to expose the substrate would be obvious since Sato et al. require the entire surface be oxidized.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sato et al. by utilizing ion beam sputtering and a shutter in an ion beam device as taught by Pinarbasi because it allows for oxidizing the entire surface.

Claims 2-5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (U.S. Pat. 5,986,858) in view of Deguchi et al. (U.S. Pat. 5,862,021).

Sato et al. is discussed above and all is applies above. (See Sato et al. discussed above) Regarding claim 14, Sato et al. discussed above already teach the spacer layer being deposited before significant oxidation of the first ferromagnetic layer. (See Sato et al. discussed above)

The difference between Sato et al. and the present claims is that the oxygen partial pressure is not discussed.

Regarding claim 2, Deguchi et al. teach that the oxide layers can be formed by a natural oxidation process, thermal oxidation process or a plasma oxidation process. (See Sato et al. discussed above) Deguchi et al. teach that instead of a natural oxide process to form an oxide film (Column 5 lines 28-32) that a cobalt oxide layer can be formed by sputtering in the presence of Ar and O<sub>2</sub> at 3 mTorr. The partial pressure of the oxygen can range from  $2.5 \times 10^{-5}$  Torr to  $3.0 \times 10^{-5}$  Torr when the total gas pressure is 3 mTorr. (Column 9 lines 29-44)

Regarding claim 3, as discussed above sputtering the metal films and either oxygen treating or sputtering in oxygen would result in decreasing the oxygen level to zero before depositing the subsequent layers. (See Sato et al. discussed above)

Regarding claim 4, in Sato et al. the first surface is exposed to an oxygen partial pressure before depositing the aluminum spacer layer. (See Sato et al. discussed above)

Regarding claim 5, in Sato et al. the second surface is exposed to an oxygen partial pressure before depositing the second ferromagnetic layer. (See Sato et al. discussed above)

The motivation for utilizing oxygen at a particular partial pressure to form the layer is that it allows for controlling the coercive force. (Column 9 lines 29-44)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sato et al. by utilizing a particular partial pressure for oxygen as taught by Deguchi et al. because it allows for controlling coercive force of the films.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Deguchi et al. as applied to claims 2-5 and 14 above, and further in view of Pinarbasi (U.S. Pat. 5,871,622).

The difference between Sato et al. and the present claims is that ion beam sputtering for forming the layers is not discussed (Claim 11) and the use of a shutter for exposing the surface to oxygen is not discussed (Claim 12).

Regarding claim 11, Sato et al. teach utilizing ion beam sputtering for forming the layers of a spin valve magnetoresistance head. (See Abstract)

Regarding claim 12, Pinarbasi teach in Fig. 1 an ion beam sputtering device having a shutter 106. (See Fig. 1) Having the shutter 106 open to expose the substrate would be obvious since Sato et al. require the entire surface be oxidized.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sato et al. by utilizing ion beam sputtering and a shutter in an ion beam device as taught by Pinarbasi because it allows for oxidizing the entire surface.

### ***Response to Arguments***

Applicant's arguments filed August 30, 2006 have been fully considered but they are not persuasive.

In response to the argument that Sato et al. do not teach that the oxygen partial pressure is decreased before depositing the Al layer, it is argued that the oxygen partial pressure would decrease since the Al is sputtered from a target which requires placing the substrate in a vacuum chamber for performing a sputtering process. Initially the substrate could be positioned outside the vacuum chamber for oxidation through natural oxidation (i.e. from the air or atmosphere) and then placed in a sputtering chamber which requires a reduction in pressure through a vacuum pump in order to perform the sputtering process. Drawing the vacuum would inherently decrease the partial pressure of oxygen. (See Sato et al. discussed above)

In response to the argument that there is no support for removing the oxygen in Sato et al., it is argued that there is support in Sato et al. for removing the oxygen since



Sato et al. require sputtering and sputtering is done inherently in a vacuum chamber where oxygen is removed by a vacuum pump. (See Sato et al. discussed above)

In response to the argument that the shutter of Pinarbasi is not opened to expose the substrate, it is argued that the shutter in Pinarbasi is initially closed to clean the target and then fully opened to expose the substrate to depositing material. Therefore, Pinarbasi do teach a fully opened shutter. (See Pinarbasi Column 6 lines 60-68)

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

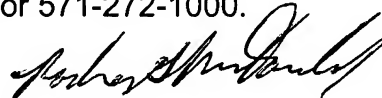
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald  
Primary Examiner  
Art Unit 1753

RM  
November 6, 2006